GREAT TRANSITION INITIATIVE
TOWARD A TRANSFORMATIVE VISION AND PRAXIS

The Agroecology Revolution

GTI Roundtable

April 2016

Industrial agriculture leads to high pollution and waste, exacerbates climate change and the concentration of wealth, and is bad for human health. But can an agroecological farming system feed the world? Frances Moore Lappé argues it can and must, pointing to on-the-ground successes. Our panelists discuss such initiatives and the roadblocks to a sustainability transition in agriculture.

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Farming for a Small Planet: Agroecology Now

Frances Moore Lappé

Abstract: The primary obstacle to sustainable food security is an economic model and thought system, embodied in industrial agriculture, that views life in disassociated parts, obscuring the destructive impact this approach has on humans, natural resources, and the environment. Industrial agriculture is characterized by waste, pollution, and inefficiency, and is a significant contributor to climate change. Within so-called free market economics, enterprise is driven by the central goal of bringing the highest return to existing wealth. This logic leads inexorably to the concentration of wealth and power, making hunger and ecosystem disruption inevitable. The industrial system does not and cannot meet our food needs. An alternative, relational approach—agroecology—is emerging and has already shown promising success on the ground. By dispersing power and building on farmers' own knowledge, it offers a viable path to healthy, accessible food; environmental protection; and enhanced human dignity.

A GREAT TRANSITION INITIATIVE ESSAY

People yearn for alternatives to industrial agriculture, but they are worried. They see large-scale operations relying on corporate-supplied chemical inputs as the only high-productivity farming model. Another approach might be kinder to the environment and less risky for consumers, but, they assume, it would not be up to the task of providing all the food needed by our still-growing global population.

Contrary to such assumptions, there is ample evidence that an alternative approach—organic agriculture, or more broadly "agroecology"—is actually the *only* way to ensure that all people have access to sufficient, healthful food. Inefficiency and ecological destruction are built into the industrial model. But, beyond that, our ability to meet the world's needs is only partially determined by what quantities are produced in fields, pastures, and waterways. Wider societal rules and norms ultimately shape whether any given quantity of food produced is actually used to meet humanity's needs. In many ways, how we grow food determines who can eat and who cannot—no matter how much we produce. Solving our multiple food crises thus requires a systems approach in which citizens around the world remake our understanding and practice of democracy.

Agroecology is the *only* way to ensure that all people have access to sufficient, healthful food.

Today, the world produces—mostly from low-input, smallholder farms—more than enough food: 2,900 calories, amounting to three to four pounds of food, per person per day. Per capita food availability has continued to expand despite ongoing population growth. This ample supply of food, moreover, comprises only what is left over after about half of all grain is either fed to livestock or used for industrial purposes, such as agrofuels.[1]

Despite this abundance, 800 million people worldwide suffer from long-term caloric deficiencies. One in four children under five is deemed stunted—a condition, often bringing lifelong health challenges, that results from poor nutrition and an inability to absorb nutrients. Two billion people are deficient in at least one nutrient essential for health, with iron deficiency alone implicated in one in five maternal deaths.[2]

The total *supply* of food alone actually says little about whether the world's people are able to meet their nutritional needs. We need to ask why the industrial model leaves so many behind, and then determine what questions we *should* be asking to lead us toward solutions to the global food crisis.

Hidden, Vast Inefficiencies

The industrial model of agriculture—defined here by its capital intensity and dependence on purchased inputs of seeds, fertilizer, and pesticides—creates multiple unappreciated sources of inefficiency. Economic forces are a major contributor here: the industrial model operates within what are commonly called "free market economies," in which enterprise is driven by one central goal, namely, securing the highest immediate return to existing wealth. This leads inevitably to a greater concentration of wealth and, in turn, to greater concentration of the capacity to control market demand within the food system. The result? Demand by the better-off minority shifts production toward grain-fed animal foods, greatly diminishing the overall food supply because of the poor conversion rate of feed to food. The most extreme example is the feeding of grain to cattle. Of the calories in the feed that cattle consume, humans receive just 3 percent through beef. US agriculture, in large part because of its livestock focus, actually feeds fewer people per acre than that of India or China.[3]

This imbalance is exacerbated by other systemic inefficiencies within the industrial model. Of the synthetic nitrogen fertilizer added to the soil globally, at least half is never taken up by plants, but is instead washed or blown away. Moreover, economically and geographically concentrated production, requiring lengthy supply chains and involving the corporate culling of cosmetically blemished foods, leads to massive outright waste: more than 40 percent of food grown for human consumption in the United States never makes it into the mouths of its population.[4]

Industrial agriculture is unable to register its own self-destructive impacts.

A System Logic of Disassociated Parts

The underlying reason industrial agriculture cannot meet humanity's food needs is that its system logic is one of disassociated parts, not interacting elements. It is thus unable to register its own self-destructive impacts on nature's regenerative processes. Industrial agriculture, therefore, is a dead end.

Consider the current use of water in agriculture. About 40 percent of the world's food depends on irrigation, which draws largely from stores of underground water, called aquifers, which make up 30 percent of the world's freshwater. Unfortunately, groundwater is being rapidly depleted worldwide. In the United States, the Ogallala Aquifer—one of the world's largest underground bodies of water—spans eight states in the High Plains and supplies almost one third of the groundwater used for irrigation in the entire country. Scientists warn that within the next thirty years, over one-third of the southern High Plains region will be unable to support irrigation. If today's trends continue, about 70 percent of the Ogallala groundwater in the state of Kansas could be depleted by the year 2060.[5]

Large amounts of groundwater and river flows are also drawn into highly inefficient livestock production. More than half of the water use in the Colorado River basin, spanning six states, is devoted to feeding cattle and horses. In drought-stricken California, nearly a fifth of irrigation water goes to one feed crop: alfalfa. Every year, 100 billion gallons of California water in the form of alfalfa go to China for meat production.[6]

Beyond water waste and rapid depletion of groundwater—which recharges slowly and thus, in practical terms, is nonrenewable—nutrient application via synthetic fertilizer in the industrial model is not only inefficient, but also highly destructive. Nitrogen runoff ends up in waterways, where it is destroying marine life, creating over 400 aquatic "dead zones" worldwide. Some scientists are now warning that we have disrupted the nitrogen cycle even more radically than the carbon cycle.[7]

Industrial agriculture also depends on massive phosphorus fertilizer application—another dead end on the horizon. Almost 75 percent of the world's reserve of phosphate rock, mined to supply industrial agriculture, is in a politically unstable area of northern Africa centered in Morocco and Western Sahara. Since the mid-twentieth century, humanity has extracted this "fossil" resource, processed it using climate-harming fossil fuels, spread four times more of it on the soil than occurs naturally, and then failed to recycle the excess. As with nitrogen, much of this phosphate escapes from farm fields, ending up in ocean sediment where it remains unavailable to humans. Within this century, the industrial trajectory will lead to "peak phosphorus"—the point at which extraction costs are so high, and prices out of reach for so many farmers, that global phosphorus production begins to decline.[8]

Industrial farming contributes more greenhouse gas emissions than the transportation sector.

Beyond depletion of specific nutrients, the loss of soil itself is another looming crisis for agriculture. Worldwide, soil is eroding at a rate ten to forty times faster than it is being formed. To put this in visual terms, each year, enough soil is washed and blown from fields globally to fill roughly four pickup trucks for every human being on earth.[9]

Climate Change Culprit

The industrial model of farming is not a viable path to meeting humanity's food needs for yet another reason: it contributes nearly 20 percent of all anthropogenic greenhouse gas emissions, even more than the transportation sector. The most significant emissions from agriculture are carbon dioxide, methane, and nitrous oxide. Carbon dioxide is released in deforestation and subsequent burning, mostly in order to grow feed, as well as from decaying plants. Methane is released by ruminant livestock, mainly via their flatulence and belching, as well as by manure and in rice paddy cultivation. Nitrous oxide is released largely by manure and manufactured fertilizers. Although carbon dioxide receives most of the attention, methane and nitrous oxide are also serious. Over a hundred-year period, methane is, molecule for molecule, 34 times more potent as a heat-trapping gas, and nitrous oxide about 300 times, than carbon dioxide.[10]

Our food system also increasingly involves transportation, processing, packaging, refrigeration, storage, wholesale and retail operations, and waste management—all of which emit greenhouses gases. Accounting for these impacts, the total food system's contribution to global greenhouse gas emissions, from land to landfill, could be as high as 29 percent. Most startlingly, emissions from food and agriculture are growing so fast that, if they continue to increase at the current rate, they alone could use up the safe budget for all greenhouse gas emissions by 2050.[11]

Livestock production is the primary contributor to climate change from the food system. It is not possible to pin down precisely how much of agriculture's contribution to the climate crisis stems from industrial versus traditional farming; however, because livestock lie at the heart of the industrial model, and the manufacture and distribution of synthetic inputs require fossil fuels, it is clear that industrial agriculture dominates the sector's contribution to climate change. Driven by the narrowly focused pressure to bring the highest return to ever-larger farm operations, corporate suppliers, and food processors, the industrial system disrupts nature's regenerative capacities, leading to the rapid depletion and destabilization of the complex systems that we need in order to grow food.

The system logic of industrial agriculture, which concentrates social power, is itself a huge risk for human well-being.

Perversely Aligned with Nature

These dire drawbacks are mere symptoms. They flow from the internal logic of the model itself. The reason that industrial agriculture cannot meet the world's needs is that the structural forces driving it are misaligned with nature, including human nature.

Social history offers clear evidence that concentrated power tends to elicit the worst in human behavior. Whether for bullies in the playground, autocrats in government, or human subjects in psychological studies such as the famous Stanford Prison Experiment, concentrated power is associated with callousness and even brutality *not in a few of us, but in most of us.*[12] The system logic of industrial agriculture, which concentrates social power, is thus itself a huge risk for human well-being. At every stage, the big become bigger, and farmers become ever-more dependent on ever-fewer suppliers, losing power and the ability to direct their own lives.

The seed market, for example, has moved from a competitive arena of small, family-owned firms to an oligopoly in which just three companies—Monsanto, DuPont, and Syngenta—control over half of the global proprietary seed market. Worldwide, from 1996 to 2008, a handful of corporations absorbed more than two hundred smaller independent companies, driving the price of seeds and other inputs higher to the point where their costs for poor farmers in southern India now make up almost half of production costs.[13] And the cost in real terms per acre for users of bio-engineered crops dominated by one corporation, Monsanto, tripled between 1996 and 2013.

Not only does the industrial model direct resources into inefficient and destructive uses, but it also feeds the very root of hunger itself: the concentration of social power. This results in the sad irony that small-scale farmers—those with fewer than five acres—control 84 percent of the world's farms and produce most of the food by value, yet control just 12 percent of the farmland and make up the majority of the world's hungry.[14]

With its assumption of disassociated parts, the industrial model also fails to address the relationship between food production and human nutrition. Driven to seek the highest possible immediate financial returns, farmers and agricultural companies are increasingly moving toward monocultures of low-nutrition crops such as corn—the dominant US crop—that are often processed into empty-calorie "food products." As a result, from 1990 to 2010, growth in unhealthy eating patterns outpaced dietary improvements in most parts of the world, including the poorer regions. Most of the key causes of non-communicable diseases are now diet-related, and by 2020, such diseases are predicted to account for nearly 75 percent of all deaths worldwide.[15]

The new model reflects a shift from a disassociated to a relational way of thinking arising across many fields.

A Better Alternative

What model of farming can end nutritional deprivation while restoring and conserving food-growing resources for our progeny? The answer lies in the emergent model of agroecology, often called "organic" or ecological agriculture. Hearing these terms, many people imagine simply a set of farming practices that forgo purchased inputs, relying instead on beneficial biological interactions among plants, microbes, and other organisms. However, agroecology is much more than that. The term as it is used here suggests a model of farming based on the assumption that within any dimension of life, the organization of relationships within the whole system determines the outcomes. The model reflects a shift from a disassociated to a relational way of thinking arising across many fields within both the physical and social sciences. This approach to farming is coming to life in the ever-growing numbers of farmers and agricultural scientists worldwide who reject the narrow productivist view embodied in the industrial model as they create highly effective relational approaches.

Recent studies have dispelled the fear that an ecological alternative to the industrial model would fail to produce the volume of food for which the industrial model is prized. In 2006, a seminal study in the Global South compared yields in 198 projects in 55 countries and found that ecologically attuned farming increased crop yields by an average of almost 80 percent. A 2007 University of Michigan global study concluded that organic farming could support the current human population, and expected increases without expanding farmed land. Then, in 2009, came a striking endorsement of ecological farming by fifty-nine governments and agencies, including the World Bank, in a report painstakingly prepared over four years by four hundred scientists urging support for "biological substitutes for industrial chemicals or fossil fuels."[16] Such findings should ease concerns that ecologically aligned farming cannot produce sufficient food, especially given its potential productivity in the Global South, where such farming practices are most common.

Democratizing Farming

Ecological agriculture, unlike the industrial model, does not inherently concentrate power. Instead, as an evolving practice of growing food within communities, it disperses and creates power, and can enhance the dignity, knowledge, and the capacities of all involved. Agroecology can thereby address the powerlessness that lies at the root of hunger.

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Applying such a systems approach to farming unites ecological science with time-tested traditional wisdom rooted in farmers' ongoing experiences. Agroecology also includes a social and politically engaged movement of farmers, growing from and rooted in distinct cultures worldwide. As such, it cannot be reduced to a specific formula, but rather represents a range of integrated practices, adapted and developed in response to each farm's specific ecological niche. It weaves together traditional knowledge and ongoing scientific breakthroughs based on the integrative science of ecology. By progressively eliminating all or most chemical fertilizers and pesticides, agroecological farmers free themselves—and, therefore, all of us—from reliance on climate-disrupting, finite fossil fuels, as well as from other purchased inputs that pose environmental and health hazards.

Organic farming, commonly understood as farming with no synthetic pesticides and fertilizers, is a key dimension of agroecology. Globally, organically farmed land more than doubled in the decade before 2011, and in India, it grew almost eightfold. Two million farmers—most of whom are small farmers in the Global South—are now certified organic, while many more use organic practices.[17] Worldwide, officially recognized organic farmland still makes up only about 1 percent of the total; however, it is widely appreciated that many farmers using organic practices are too poor to afford the certification process.[18]

In another positive social ripple, agroecology is especially beneficial to women farmers. In many areas, particularly in Africa, nearly half or more of farmers are women, but too often they lack access to credit.[19] Agroecology—which eliminates the need for credit to buy synthetic inputs—can make a significant difference for them.

Agroecological practices also enhance local economies as profits on farmers' purchases no longer seep away to corporate centers elsewhere. After switching to practices that do not rely on purchased chemical inputs, farmers in the Global South commonly make natural pesticides using local ingredients—mixtures of neem tree extract, chili, and garlic in southern India, for example. Local farmers purchase women's homemade alternatives and keep the money circulating within their community, benefiting all.[20]

Besides these quantifiable gains, farmers' confidence and dignity are also enhanced through agroecology. Its practices rely on farmers' judgments based on their expanding knowledge of their land and its potential. Success depends on farmers' solving their own problems, not on following instructions from commercial fertilizer, pesticide, and seed companies. Developing better farming methods via continual learning, farmers also discover the value of collaborative working relationships. Freed from dependency on purchased inputs, they are more apt to turn to neighbors—sharing seed varieties and experiences of what works and what does not for practices like composting or natural pest control. These relationships encourage further experimentation for ongoing improvement. Sometimes, they foster collaboration beyond the fields as well—such as in launching marketing and processing cooperatives that keep more of the financial returns in the hands of farmers.

Farmers' confidence and dignity are enhanced through agroecology.

Going beyond such localized collaboration, agroecological farmers are also building a global movement. La Vía Campesina, whose member organizations represent 200 million farmers, fights for "food sovereignty," which its participants define as the "right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods." This approach puts those who produce, distribute, and consume food—rather than markets and corporations—at the heart of food systems and policies, and defends the interests and inclusion of the next generation.

Lessons from Tigray, Ethiopia

Case studies in some of the world's hungriest regions can illuminate the potential of agroecology to meet global needs. The experience of Tigray, Ethiopia, an extremely cash-poor region of almost five million people with degraded soils and poor crop yields, offers one promising example. In part because of the region's low rainfall, the "hunger season" for the poorest farmers has typically lasted more than half the year, and climate change has intensified such hardships. In 1996, national and regional agencies took action. Working with the Institute for Sustainable Development, they launched a transformational strategy with the goal of restoring soil fertility as well as developing community-environmental governance.[21]

The Tigray Project worked with farmers to infuse a few basic agroecological practices, like composting, into their work. Unlike chemical fertilizers, which require application every year, good compost can increase and maintain soil fertility for up to four years. Thanks to healthier soil, farmers began achieving higher yields, with fewer challenging weeds, and their crops became more resistant to disease and pests. Stopping the uncontrolled grazing of livestock allowed for the revegetation of degraded lands, including steep slopes and gullies not suitable for agricultural production. This previously "useless" land now provides biomass for livestock feed or compost, thereby returning nutrients to the soil. In just five years, from 2000 to 2005, farmers doubled yields of cereals grown on compost-treated soil. The project incorporated other innovations as well, such as the creation of small trenches along the bunds (low earthen ridges) between fields to catch rain and soil runoff, and tree planting and the nurturing of tree regrowth.

The project clarifies the social dimension of addressing hunger. From its beginning, villagers have assumed leadership via local associations with elected representatives. The associations create and enforce community by-laws, and, through these associations, villagers make a series of public commitments on issues like water conservation. Some commitments are very specific, such as how many acres of land a person commits to plant with trees and the number of days of service he or she will contribute labor to soil and water conservation projects that benefit everyone.

Tigray's positive experience is reflected in the results of many similar initiatives throughout the world.

Using these practices, Tigray farmers now produce enough food to maintain a full year's reserve, and their farms' greater crop diversity enhances resiliency. By 2008, 86 percent of the nearly seven hundred thousand farmers in the region were using natural fertilizer on nearly half a million acres. Chemical fertilizer use fell 40 percent by weight between 1998 and 2005, while grain production climbed more than 80 percent. Some farmers even produce a surplus that they can sell, raising their incomes more than tenfold, to roughly $700 a year. The ripples from this project have continued, as the Ethiopian government is spreading many of the Tigray-tested ecological practices, which have reached about a quarter of the country's rural districts so far.[22] Tigray's positive experience is reflected in the results of many similar initiatives throughout the world.[23]

A Viable Vision?

Despite the many strengths of the ecological farming model, objections still arise. Many who discount agroecology as a scalable solution note that in the Global North, it now contributes a very small share of total production. Moreover, in the Global South, small farms lack the knowledge and decision-making power to convert to successful ecological methods. Of course, these concerns refer not to shortcomings of the model itself, but instead raise questions about whether humanity can make the *political* choices necessary for the shift of direction essential to embrace it. The answer will depend largely on how widely and deeply people appreciate the failure of the industrial model and the availability of a viable alternative. Disseminating information such as that reported here is therefore vital to fostering broad-based understanding and popular mobilization for change.

Once citizens come to appreciate that the industrial agriculture model is a dead end, the challenge becomes strengthening democratic accountability in order to shift public resources away from it. Today, those subsidies are huge. By one estimate, almost half a trillion tax dollars in OECD countries, plus Brazil, China, Indonesia, Kazakhstan, Russia, South Africa, and Ukraine.[24] Imagine the transformative impact if a significant share of those subsidies began helping farmers' transition to agroecological farming.

Making Nutrient Cycling Practical

Agroecology's core principle of aligning with nature's regenerative processes is the direction all human systems must take.

Even those aware of the evidence of agroecology's already proven yields, as well as projections about its potential, suggest that the soil nutrient cycling required to replace synthetic fertilizers on a grand scale is impractical in an increasingly urbanized world. But agroecology's core principle of aligning with nature's regenerative processes is the direction *all* human systems must take if humanity is to thrive, or even survive. As resources are shifted toward regenerative farming practices, we will no doubt learn ever-better ways to cycle soil nutrients.

The shift is already beginning. In 2012, the European Union called on members to reuse virtually 100 percent of phosphorus by 2020, and Sweden already requires 40 percent of phosphorus in sewage to be recycled back into the soil.[25] However, in the United States, cycling nutrients through what are called "biosolids"—fertilizers produced from treated solid waste separated from municipal sewage—has attracted many critics who note the difficulty of removing heavy metals and other contaminants from sewage sludge, which includes waste from industrial sources, and safely applying it to fields.

Solutions, however, are emerging. One promising example is a process called "nutrient recovery." Since most of the nitrogen and phosphorus is in wastewater, this technique focuses there, extracting only these nutrients, not the toxics. In a process called "struvite precipitation," phosphorus crystallizes with other elements and is withdrawn from the wastewater to become fertilizer. In this crystalline form, the phosphorus is virtually insoluble in water, and therefore does not leach into waterways. Plants can activate the phosphorus as they grow, but only when they need it, helping to reduce the current vast waste of phosphorus.[26]

The part of the human waste stream richest in both nitrogen and phosphorus is, in fact, urine. Urine is essentially sterile, and for centuries, humans have found simple ways to return it, with these key nutrients, to the soil. Today, it remains a largely untapped source of plant nutrition, although deriving fertilizer from urine is catching on in countries like the Netherlands. In 2014, Amsterdam's public water utility invited male residents to use urinals specially designed to collect urine to fertilize rooftop gardens, playfully calling it "peecycling." In West Africa, seven hundred families in eight Niger villages are cycling all the nutrients in their own waste back to their fields using waterless toilets and simple urinals—low-energy and low-cost—and enjoying yields equal to or better than those obtained with chemical fertilizers.[27]

A big factor in making nutrient cycling practical is reducing the distance between where food is grown and where it is consumed. Because three-quarters of food is still eaten in the country in which it is grown, and because most countries are not as vast as the United States, this reconnection may be less daunting than it seems. Many governments in Latin America and the Caribbean have specific policies to promote urban and periurban farming. In Cuba, 40 percent of households grow some of their own food; in Guatemala and Saint Lucia, 20 percent do. Cuba also helps farmers move soil nutrient sources, such as compost, to where they are needed. Agroecological urban farming in Cuba, in turn, helped to lift the country's average caloric availability from less than 2,000 calories per capita per day in the 1990s to more than 3,000 by 2005.[28]

If humanity can master space travel, surely we can tackle the logistical challenges of nutrient cycling.

If humanity can master space travel and decode the genome, surely we can grasp the laws of biology and tackle the logistical challenges of nutrient cycling. Worldwide, less than 1 percent of agricultural research focuses on advancing the knowledge and practice of organic farming.[29] If we shifted course, the potential for agroecological farming could be realized on a global scale.

Reversing the Pressure to Leave Farming

Skeptics of agroecology doubt that sufficient human labor could be mobilized to supply what would be required to take it to scale. Even if they had the opportunity, these skeptics say, too few people would actually choose to remain in such arduous work in rural environments with fewer amenities than cities offer.

Evidence, however, suggests otherwise. True, urban centers are swelling, and half of us now live in cities. But is the force behind this shift a pull to attractive urban life or largely a push by unfair returns to farmers, as well as by land hoarders and grabbers who are effectively evicting agrarian populations?

Today, more than a third of humanity depends directly on agriculture for their livelihood, and many want to remain where they are because of deep cultural and family roots—*as long as they can also enjoy the rewards*. In fact, many rural people want to stay on their farms so much that they risk their lives resisting land grabs by foreign interests. The colonial seizures of land in the nineteenth century continued into the twentieth. And today, China, Saudi Arabia, Kuwait, Qatar, and South Korea, among others, are buying up or leasing vast tracts to provide food—not for local people, but for their own consumers—and produce crops for fuel. Land grabs in Africa since 2000 alone total an area as large as Kenya.[30]

Such pressure is, of course, only one reason for migration to cities. More widespread is simply the inability to earn enough from farming, along with such hardships as lack of public investment in rural market roads, schools, clinics, and agricultural extension. The disadvantages of rural life result from choices made by elite-controlled governments, unrelated to the inherent potential appeal of rural life. Relatively small investments and improvements, however, may be able to turn the tide. In the central plateau of Burkina Faso in West Africa, outmigration stopped when life in the villages was improved through water and soil conservation practices along with the integration of trees and crops. One village, which had lost a quarter of its population in the ten years before the new practices began, did not lose a single family once ecological farming increased crop yields and led to improved food security.[31]

The essential questions about whether humanity can feed itself well are political.

Finally, any accurate appraisal of the viability of a more ecologically attuned agriculture must also let go of the idea that the food system is already so globalized and corporate-dominated that it is too late to scale up a relational, power-dispersing model of farming. As noted earlier, more than three-quarters of all food grown does not cross borders. Instead, in the Global South, the number of small farms is growing, and small farmers produce 80 percent of what is consumed in Asia and Sub-Saharan Africa.[32]

The Right Path

When we address the question of how to feed the world, we need to think relationally—linking current modes of production with our future capacities to produce, and linking farm output with the ability of all people to meet their need to have nutritious food and to live in dignity. Agroecology, understood as a set of farming practices aligned with nature and embedded in more balanced power relationships, from the village level upward, is thus superior to the industrial model. This emergent relational model offers the promise of an ample supply of nutritious food needed now and in the future, and more equitable access to it.

Reframing concerns about inadequate supply is only the first step toward necessary change. The essential questions about whether humanity can feed itself well are social—or, more precisely, political. Can we remake our understanding and practice of democracy so that citizens realize and assume their capacity for self-governance, beginning with the removal of the influence of concentrated wealth on our political systems?

Democratic governance—accountable to citizens, not to private wealth—makes possible the public debate and rule-making necessary to re-embed market mechanisms within democratic values and sound science. Only with this foundation can societies explore how best to protect food-producing resources—soil, nutrients, water—that the industrial model is now destroying. Only then can societies decide how nutritious food, distributed largely as a market commodity, can also be protected as a basic human right.

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About the Author

Frances Moore Lappé is the co-founder of Food First, the Institute for Food and Development Policy, and the Small Planet Institute. She is the author of eighteen books, including the three-million-copy *Diet for a Small Planet*, and, most recently, *World Hunger: 10 Myths*, co-authored with Joseph Collins. Lappé has received eighteen honorary doctorates, as well as the Right Livelihood Award, often called the "Alternative Nobel," and the James Beard Foundation's "Humanitarian of the Year" award. *Gourmet Magazine* chose her among twenty-five people whose work has changed the way America eats. Lappé has been a visiting scholar at the Massachusetts Institute of Technology and the University of California, Berkeley.

Roundtable

Vicki Assevero

Bravo once again to GTI for the substantive discussion provoked by Frances Lappé's sober and lucid critique of Big Ag. The comments have been particularly useful this time because there are so many interesting organizations working for "Agroecology Now."

I founded and manage The Green Market Santa Cruz in Trinidad, where for the past three years we have been striving to educate both farmers and consumers about what it takes to grow healthy food and healthy communities. We have been supporting small local farmers through our CSA (community supported agriculture) program and through our Edible Talk series demonstrating the interconnectedness of all things.

The comment I want to make is a reflection on two lines in the essay: "The underlying reason industrial agriculture cannot meet humanity's food needs is that its system logic is one of disassociated parts, not interacting elements. It is thus unable to register is own self-destructive impacts on nature's regenerative processes" and "Once citizens come to appreciate that the industrial agriculture model is a dead end, the challenge becomes strengthening democratic accountability in order to shift public resources away from it."

This inability of corporations to be self-reflective and self-aware is an ethical issue. The "personhood" attributed to these multinational entities by our legal systems lulls us into forgetting that the system logic of disassociated parts is the very foundation of the industrial system. It is the profoundly anti-democratic nature of the dissociative organization of industry that is creating the cognitive dissonance in this late phase of capitalism. We have silos in academia and government absolutely incapable of the integrative interdisciplinary and holistic approaches required to regulate and manage our common destiny in the interest of democratically governed human beings.

Unlike Lappé, I think corporations do register their destructive impacts on Nature (i.e. planetary wellbeing) much earlier than they let on; they hide the deleterious effects through accounting rules that do not reflect true costs, and worse, they continue the fear-mongering mantras of scarcity in a world that still provides abundance. It becomes difficult for citizens of the various countries comprising our political world to "appreciate" that industrial agriculture is a dead end when they are constantly told otherwise and furthermore they are largely impotent because the systems of democratic accountability in most nations are in tatters.

Far from despairing, I am challenged "to remake our understanding and practice of democracy," especially at the community level where a deep ethic of interdependence and interconnectedness can grow roots so deep that the agroecology that we practice to nourish ourselves, our lands, and our local ecosystems transcends the noxious national and global politics that protects industrial agriculture's (and Big Pharma's) profits.

The Green Market is making progress engaging with the corporate sector through our "Eat Local Challenge," which is highlighting the lack of sustainability of Trinidad's huge food import bill. As people here come to understand the importance of food security, we are beginning the sensible conversation about how to incentivize and revitalize agriculture using the techniques and philosophy of agroecology.

About the Author

Vicki Assevero is an international lawyer with a longstanding interest in sustainable development. She represented multinational energy companies and international organizations early in her career with Duncan, Allen & Talmage in Cote d'Ivoire after working with The Commerce Department and the OECD in Paris. She shifted to representing developing countries in their negotiations with multilateral banks and investors as a partner at Holland & Knight, and she represented the Bar of the City of New York at Rio+20. She founded The Green Market in Santa Cruz, Trinidad, in 2012 as a practical experiment in community-based sustainable development concentrating on changing patterns of food consumption and production. She is a graduate of Yale University and Harvard Law School.

M. Jahi Chappell

Lappé has given an excellent summary of many of the challenges, and opportunities, facing us. I want to bring in a quote that she has often used in the past:

"[There are] core, often unspoken, assumptions and forces—economic, political, and psychological—now taking our planet in a direction that as individuals none of us would choose."

The thing that regularly excites me about the future, a potentially food-sovereign and agroecological future, goes back to this oft-made point: very, very few people would choose the direction we're going in—that capitalism's forces and assumptions so often push us. It can be easy to forget this, given the triumphant technocratic narratives that surround us. But, with apologies to Mark Twain, the news of capitalism's vitality has been greatly exaggerated.

We, of course, are seeing that in various ways right now. Rather than seeing, for example, Occupy Wall Street, Black Lives Matter, the rise of Bernie Sanders, the growth of La Vía Campesina, and many other recent events as discrete points, I view them as continuing manifestations of a rising tide for change. Political scientist John Kingdon pointed out three decades ago that specific issues rise and fall in the public agenda process, but the dynamics underneath them—public awareness, potential solutions, and attention from elected officials—continue evolving even when they are not at the top of the list.[1] Said another way, it can take many years for significant change to happen, but that doesn't mean that all previous attempts at change "failed." Any one of them could have worked, but there is a large dose of random chance (luck) in social change, alongside planning and opportunity. But all the while, the underlying desire for change, the continuing experiments, examples, and imaginaries draw us ever closer to what will in retrospect likely look like a sudden switch to a better way. And each event, each manifestation, each movement, makes that switch a bit more conceivable, a bit more likely to happen.

Despite the hubris of capitalism's promoters, if we know one thing with high certainty, it is that capitalism is unlikely to be the ultimate and everlasting expression of human economic organization. Claims that it best aligns with human nature take too pessimistic a view of what people are capable of, remain intentionally blind to all the counterevidence, and take too optimistic a view on the stability of human beings' own conceptions of what "human nature" looks like.

Many of the various members of the nobility thought feudalism was the ideal and eternal system.

Mercantilists were not looking at their world and going "this is just a phase."

Colonialists all around the globe each had their own version of thinking that the sun would never set on their empire.

The world changes. Capitalism is simply not the last system we will have. Are we guaranteed to have a better one? Not by a long shot. Can we have a better one? Absolutely.

And so we return to the promise of agroecology, and its partner, food sovereignty. They are both concepts that are still evolving—more processes than destinations.[2] They will only be realized, and improved, in the practice. The exciting thing is that so many people *are* doing, *are* practicing, or would like to if given the opportunity. Young farmers are having an incredibly difficult time entering farming due to barriers in land access and credit. Indigenous peoples, small family farmers, pastoralists, fisherfolk, gatherers, and more around the world are struggling to hang on to their land, their rights, their sovereignty, their traditions, and their livelihoods. But these millions of people are struggling, because they believe something better than what we have now is possible (and in many cases, of course, because they do not have another choice).[3] Billions of people, in fact, want to and are in the process of pushing to take the planet in a direction that we, as parents, children, spouses, friends, and communities *would* choose. Insofar as we deepen and improve our solidarity—through agroecology, through food sovereignty, through compassion, love, and participation—we build strength and power towards change for the better. As Martin Luther King, Jr. said, "power at its best is love implementing the demands of justice, and justice at its best is love correcting everything that stands against love."[4]

Agroecology gives us a science and practices to help inform this movement towards a better, more just, more sustainable food system. Food sovereignty seeks to reunite, and to invent new ways to unite, the rights to decide and control our own food systems and the responsibilities we have to each other in our communities. Not just our local communities, but also as part of the world community. We can no longer deny that the actions of each individual have an effect on the quality of life for everyone else, and for future generations. This is why my colleague Mindi Schneider and I have recently argued that the three pillars of food system sustainability ought to be agroecology, food sovereignty, and food justice, rather than the bland, uninformative, and uninspiring "social, economic, and environmental."[5] Beyond the food system, we might think of the three pillars as democracy, justice, and ecology. But whatever you call it, one thing is clear from the growing profile for agroecology and its siblings: it represents values and needs that are deeply and genuinely felt by many people around the globe. It will be of course by no means be easy to "get there." But more and more, I believe we have every reason to think that we can.

Endnotes

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About the Author

M. Jahi Chappell is Senior Staff Scientist at the Institute for Agriculture and Trade Policy, where he provides scientific input for all of IATP's programs. He has previously consulted for the FAO, the city of Belo Horizonte, and La Vía Campesina. He is a past Chair of the Agroecology Section of the Ecological Society of America, and serves on the board of the Open Source Seed Initiative. His first book, tentatively titled *Beginning to End Hunger: Food, Policy, and the Environment in Belo Horizonte, Brazil*, will be published by the University of California Press in 2017. He holds a PhD. in Ecology and Evolutionary Biology from the University of Michigan and conducted postdoctoral work in Science and Technology Studies at Cornell University.

Jennifer Clapp

I would like to begin by thanking Frances Moore Lappé for a superb essay with a clear call to action for more ecologically-based food system models. The essay highlights key points that really resonate about the problems with the industrial agricultural model and the vast potential of agroecology as an alternative.

As Lappé notes, industrial agriculture is not just a technological approach to agriculture, but a broader model enmeshed in economic relationships. I would add that it is not just a market-based system that is intimately connected with industrial agriculture, but also a globalized world food economy that relies on industrial production methods to feed global supply chains. This global industrial food system is controlled by ever-fewer transnational corporations that source and sell increasingly processed and packaged "foods" around the world, with developing countries some of their fastest growing markets. Changing agricultural production methods to more ecologically sound practices embedded in more localized markets is an important step. But correcting course to a more sustainable food system will also require broader economic policy change, including revisions to international trade and investment rules that currently reinforce the industrial model and push against alternatives.

I also applaud the essay's focus on the inefficiencies of the industrial food system. It is ironic that the advocates of the industrial food system feature efficiency as a key rationale for maintaining that system. It is important for advocates of sustainable agriculture to redefine efficiency as an ecological, rather than economic, concept. Such an approach brings out the true costs of industrial agricultural production, as the essay demonstrates so well.

Lappé's essay makes a persuasive case for agroecology as an alternative path—showing that the science demonstrates its feasibility and that, consequently, it is a political choice. It is impossible to separate the question of sustainability in the food system, as the essay so eloquently argues, from that of democratic and accountable governance.

About the Author

Jennifer Clapp is a Canada Research Chair in Global Food Security and Sustainability and Professor in the School of Environment, Resources and Sustainability at the University of Waterloo. She currently holds a Trudeau Fellowship that supports her work on the intersection of the food system, the global economy, and the environment. Her most recent books include *Food, Hunger in the Balance: The New Politics of International Food Aid*, *The Global Food Crisis: Governance Challenges and Opportunities* (co-edited with Marc Cohen), and *Corporate Power in Global Agrifood Governance* (co-edited with Doris Fuchs).

Wayne Foord

The question "How?" recurs in many discussions of the transition to agroecology. The following comments offer a perspective on this question.

The concentration of power and wealth identified within the global industrial food system extends throughout the capitalist/industrial system as a whole, and exerts a scale of influence over national and international policymaking that makes any aspirations to revitalize democracy, at these levels, relatively futile. Public awareness of global ecological crises has been growing since the 1970s, and there have been repeated calls for government to lead societal transition. Nonetheless, we are all still riding the juggernaut of industrial growth and consumerism—at least those of us in the Global North and emerging economies.

Agroecology and the democratic revitalization required to sustain it perhaps need to be built up, as far as possible, outside of the dominant system, and will only be realistically scalable when the current system begins to collapse. This will happen when fossil energy is no longer affordable to sustain the industrial food system, and industrial civilization as a whole. We may be approaching that stage if we have to resort to expensive and dangerous measures like "fracking."

The Cuban "Special Period," following the demise of the Soviet Union, is our best (and perhaps only) model for successful adaptation to energy scarcity and transition to scaled-up agroecology. With the loss of fuel imports and agricultural inputs, industrial farms collapsed. A key factor in Cuba's survival and transition was the existence of peasant farming on 20% of farmland, practicing traditional agroecological methods. These methods were disseminated and supported by modern agroecological research.[1]

Another dimension of Cuba's adaptation, relevant to the discussion about the politics of transition, was a strategy of decentralization. Centralized ministries were incapacitated by fuel shortages, so they were decentralized to provincial capitals and local municipalities. Responsibility for food production was devolved to provinces, including provision of a ration. Provinces with surpluses assisted those with deficits. The trend during the Special Period was towards more autonomous, but mutually supportive, city-regions.

City-states and "city-state cultures" (clusters of city states sharing a common language and culture) have been the norm for thousands of years of human history. They have been associated with cultural progress and have emerged after the collapse of larger political entities.[2] I would therefore propose that an agenda to promote agroecology should be more focused on city-regions and city networks, rather than wasting too much energy attempting to mobilize national government towards transition.

Endnotes

1. For an account of this, see Julia Wright, *Sustainable Agriculture and Food Security in an Era of Oil Scarcity: Lessons from Cuba* (London: Earthscan, 2009).

2. Mogens Herman Hansen, *Polis: An Introduction to the Ancient Greek City-State* (Oxford: Oxford University Press, 2006).

About the Author

Wayne Foord recently completed a PhD at Queens University Belfast, School of Politics, International Relations, and Philosophy. His thesis addressed the impact of emerging fossil energy scarcity on food security, and strategies for transition to a post-carbon food system. His postdoctoral research interests include the application of participatory scenario planning methodology to food system governance and transition, the global political economy of food, green political theory, and the politics of transition to a post-carbon society. He has previous work experience in both the non-profit and public sectors, including manager of an organic horticulture training center, manager of a peace center in Northern Ireland, administrator of EU Peace Funds in Northern Ireland, and race relations worker in London.

Sujata Dutta Hazarika

To begin with, congratulations on producing such a clear and erudite addition to discussion of the global transition to sustainability. I have been an ardent follower of GTI and am always enthusiastic to know what happens next: how we, through small baby steps, create and contribute to this rather exciting evolution of human civilization.

I would like to share a few anecdotes from the Far Eastern world, where indigenous communities managed to preserve some of the unique traditions of sustainable agriculture. This may, however, be short-lived, as they struggle to grapple with the onslaught of conventional agriculture. In Assam, conventional industrial agriculture only penetrated through the colonial capitalism of the tea industry. Food crops were fortunately not tampered with, and communities were allowed to carry on with their traditional practices. However, this is not to say that the scourges of industrial agriculture and production of tea did not impact the local ecosystem, biodiversity, and livelihood patterns owing to the indiscriminate use of chemical fertilizers for mass production. Thus, in spite of large-scale degradation of soil quality, water, and human health, what can be still salvaged is probably the invaluable indigenous knowledge of sustainable agricultural practices among the indigenous communities in areas of flood control and management, bio-fertilizers, pest control, multi-cropping, seed preservation, food storage, livelihood support, and local food security. It is remarkable that most of the tribal communities inhabiting this region have been self-sustaining in terms of their social structure and economy. Starvation deaths are unheard of, and common property resources are regulated through customary laws that ensure equity, intergenerational stability, and—to some extent—gender equality.

The traditional paradigm of sustainable agriculture is the organic agricultural practices underlined in the greater traditions of Hinduism and its grand narrative in texts such as *Vrikshayurveda* and in practices of *agnihotra yajna*, etc. The little traditions of the tribal folk cultures, such as those inhabiting the peripheries of Northeast India, often go unnoticed because of the lack of proper documentation and research in these areas. There is a great impetus in this region to go organic, given the potentials for organic farming and a growing market of citizens seeking "clean and pure food" production. Undoubtedly, there is enormous potential for this region since it is not even halfway as polluted as the other parts of India that went for intensive agriculture during the Green Revolution, such as Punjab and Bengal. Learning from the price that was paid by the Green Revolution in terms of adverse health impacts and natural resource pollution, the current agenda is to go towards an evergreen revolution with full support of the government. Regions like Northeast India, being the last frontier to the Indian post-development planning, await this attention eagerly. But, are they ready for this? A government-commissioned study should be the first step. A haphazard adoption of organic farming will not only jeopardize the ethical component of going organic, but will also uproot and destabilize prospects of agroecology in one of the most deserving regions of the world. Right now, there are a number of unorganized endeavors towards organic farming by private entrepreneurs and local farmers. However, in the absence of awareness and commitment to organic food, coordination and networking between farmers and consumers, and community and institutional support for farms to be self-sustaining in terms of seeds, storage, marketing and brand building, organic farming in Assam and Northeast India as a whole may never see the dawn of success.

In fact, even when industrial manufacturing backed by large corporations has tried to transition to sustainable practices, it has found itself bitterly overthrown. For example, in Assam in the year 2006-7, in an experiment undertaken by Dhekiajuli Tea Estate owned by Parry Agro Industries Ltd, a corporate conglomerate, tried to implement sustainable agricultural practices in its tea cultivation. The initiative was taken by the local management primarily to address the hazardous impact of toxicity in the local environment, particularly soil and water quality. The impact on the health of the resident labor population became a major concern when the management found a significant rise in the incidence of lung disease, skin infection, and birth deformity among workers. I first visited the tea garden in 2007 to conduct fieldwork with my students from the

Indian Institute of Technology, Guwahati. The experience for us was positive, and the optimism of the management and workers was contagious and motivating for the young technocrats of India's future. The management was committed to a market-driven, competitive industrial manufacturing process, but conducted a parallel experiment of vermicompost, *agnihotri yajna*, *Panchagavya* or cowpathy, Amrit pani or fermented cow dung (which generates about 250 kinds of beneficial bacteria), and other localized and organic pest control and fertilizer techniques to promote sustainable industrial growth with low chemical impact. Sources of indigenous knowledge such as the *Vrikshayurveda* were systematically explored to unearth traditional organic practices in farming and agriculture. The cultural worldview of environmental sustainability embedded in our traditional knowledge about agricultural practices and farming is elaborate in its glorification of trees and tree planting. Every topic connected with the science of plant life such as procuring, preserving, and treating of seeds before planting; preparing pits for planting saplings; selection of soil; method of watering; nourishments and fertilizers; plant diseases and plant protection from internal and external diseases; layout of a garden; agricultural and horticultural wonders; groundwater resources; etc., finds a place in these texts.

In spite of the significant improvements in environmental and human health and the quality of natural capital like land, water, and soil (which started reflecting low toxin and chemical content that is disastrous and highly polluted), the Dhekiajuli Tea Estate abandoned this experiment in 2014. Apparently, the embedded externalized costs of poor health, environmental degradation, and toxic waste generation are seldom reflected in the company balance sheet. As a result, the transition towards the new paradigm of sustainable industrialization of tea manufacture was seen as a failure in terms of production cost and output. The situation will be worse for unorganized farmers who live in rural areas and for whom agriculture is economically nonviable because of small landholdings and lack of infrastructural support. Moreover, the rather inferior value attached to manual labor makes farming a very low-prestige profession with which the emerging educated middle classes loathe to associate themselves. The push factors of emerging urbanization have made rural India and the associated attributes of village life and farming as a livelihood option unattractive to the youth. This is a dangerous trend for emerging economies: the centrifugal forces of urbanization are creating havoc with the balancing of local development of rural India and preservation of its "little and folk traditions." In fact, what is happening is even dangerous: a booming ICT, satellite TV, mobile, and internet facility is bringing the global society into the threshold of village society, but at the cost of a great loss to the self-esteem of rural India as it finds itself dispossessed of its sustainable heritage, which includes organic farming and sustainable food cultivation.

About the Author

Sujata Dutta Hazarika is the Deputy Director of the Guwahati Regional Centre at the Indira Gandhi National Open University and co-founder of Global Initiative for Sustainable Development and Planning, which seeks to redefine the role of economy and business in public policy through social innovations founded on creative and critical thinking. She began her career as a sociologist in the Department of Humanities and Social Sciences at the Indian Institute of Technology Guwahati. In 2009, she initiated the North East Centre for Research and Development. In 2010-2011, as a Fulbright Fellow, she did postdoctoral research at the University of California, Berkeley, on ecovillage initiatives in the US. She has conducted projects nationally and internationally, and published papers exploring issues of governance, internal displacement, and sustainability.

Yogi Hendlin

Lappé's essay packs lucid argumentation citing exciting research. Perhaps most important, however, she elegantly frames the issues surrounding agroecology and its structural impediments as political negligence rather than inevitability.

Her convincing counterexamples melt deflationary perspectives of predetermined outcomes and the supremacy of industrial agribusiness's overwhelming power, exposing the rich and varied minor histories and subaltern resistance of farmers and governments the world over (but especially in the Global South) simply following the engaged relational interface with the land traditional farming practices entail.

In essence, the 2013 report of the UN Conference on Trade and Development (UNCTAD) and many other such reports in the last several years agree on the necessity for a sort of devolution of farming practices.[1] Decentralization means less monocropping, which, because of synergistic nutrient cycles, requires fewer nutrient inputs and more vitamin-rich soil (and hence more nutritious vegetables). Rather than increasing monopolization and chemical inputs, regionalism, agroecological and relational food practices contextualizing fulfillment of human needs with the fortification of a resilient local ecology, is quickly gaining foothold.

The one word conspicuous by its absence from Lappé's essay that warrants appending is permaculture. In the tradition of restoration ecology, permaculture is the scientific study and practice of planting and land cultivation which meticulously composes agroecological settings so as to provide the maximum amount of food, biodiversity, and vegetal flourishing for the minimum amount of exogenous inputs.[2] The contours of agroecology and permaculture overlap significantly, and each has much to add to the conceptualization and practices of the other. A major difference is that while agroecology tends to emphasize the human dimensions of ecologically astute agriculture, permaculture tends to focus on the nutrient systems of agroecology and the compositional science of these sorts of farming practices.

Insofar as the "feeding the world" question is concerned, Lappé is on point in her critique of industrial, chemically-driven agriculture that requires ever-increasing inputs. An exhaustive study comparing organic agricultural practices to conventional, chemical-driven ones found that in the North, going organic is just shy of comparable with conventional in terms of efficiency, while in Southern countries, agroecological practices produced greater quantities of food with the same work as conventional means.[3] The net energy and resource savings of going agroecological&mash;not to mention the second-order benefits for birds, animals, insects, groundwater, and soil quality—give added impulse for agroecology as the only viable paradigm for farming practices. By historically contextualizing the rise of the poison, chemical, and fertilizer industries as a recent aberration of farming's 10,000-year varied past, it makes much more sense to return to agroecological practices that support all links in the production process.

Endnotes

1. United Nations Conference on Trade and Development, Wake Up Before It Is Too Late: Make Agriculture Truly Sustainable Now for Food Security and Changing Climate (Geneva: UNCTAD, 2013).

2. Bill Mollison, Permaculture: A Designer's Manual (Sisters Creek, Australia: Tigari Publications, 1988).

3. Catherine Badgley et al., "Organic Agriculture and the Global Food Supply," Renewable Agriculture and Food Systems 22, no. 2 (2007): 86-108.

About the Author

Yogi Hendlin is an Assistant Professor at the Dynamics of Inclusive Prosperity Initiative at Erasmus University Rotterdam, where he conducts research at the intersection of public health and environmental political philosophy. He is also a research associate at the Environmental Health Initiative at University of California, San Francisco (UCSF), where he analyzes how the chemical and fossil fuel industries marketed their products despite known environmental risks. He holds a PhD in environmental philosophy from the University of Kiel.

Marjorie Kelly

I have very much enjoyed the rich dialogue on Frances Moore Lappé's essay, "Farming for a Small Planet: Agroecology Now." It is a brilliant essay, puncturing myths that block the advance of change—particularly the myth that "large-scale operations relying on corporate-supplied chemical inputs" represent the only farming model capable of feeding the world. She advances compelling evidence that the reverse is true—that agroecology is really the only way to ensure everyone has access to healthful food.

Beyond her treatment of ecological farming methods, I was heartened to see her address two other critical social issues:

- **Concentration of ownership**—noting, for example, that a seed market once made up of small, family-owned firms is now dominated by three firms, controlling over half the global proprietary seed market.
- **The importance of democracy**—in, for example, her discussion of community-environmental governance in Tigray, Ethiopia.

There are two aspects of food production, however, that warrant more fine-tuned treatment. One is the issue of ownership and design of enterprises in the food system. The other is the issue of treatment of agricultural workers.

Lappé's essay posits a distinction between two paradigms: "industrial agriculture" and "agroecology." While she talks about the importance of more "relational" models, this analysis would benefit from greater nuance. Lappé importantly notes that the "root of hunger" is "the concentration of social power." Yet she terms her beneficial model "agroecology," and discusses this paradigm almost entirely in terms of physical farming methods. The arrangements of social power—in both industrial agriculture and agroecology—are not precisely analyzed for each paradigm.

For example, she writes, “Within so-called free market economics, enterprise is driven by the central goal of bringing the highest return to existing wealth.” This is a nice observation, as far as it goes, but it misses something. The problem is not free markets, but corporate ownership and control by an elite. One could have widespread employee ownership, for example, and still have free markets enabling consumers to choose where to buy their food.

Similarly, she discusses agroecology as a paradigm that she presumes is more relational, without building out an analysis of the importance of local, broad-based ownership and good working conditions. She is not alone in this. Consumers tend to assume that ecologically grown and locally grown equates with ethical company practices. Yet research I did at Tellus Institute a few years ago found this was not the case. In a 2012 report, “Worker Equity in Food and Agriculture,” co-authored by Tellus and Sustainalytics, we found that even organically grown food can involve poor wages and dangerous working conditions for farmworkers and food workers. We looked at worker treatment at the 100 largest US food and agriculture companies (which overwhelmingly dominate the food industry, due to market concentration), and found that the daily struggle of farmworkers was off the radar for both employers and consumers. Of the estimated 1.4 million crop workers in the US, more than half are likely undocumented, which makes them particularly vulnerable to employer abuse. Yet even legal farmworkers in the US are excluded from most provisions of the Fair Labor Standards Act, giving them no access to the minimum wage requirements, overtime rules, and unemployment insurance that other workers enjoy.

In addition to worker conditions, Lappé might consider pointing to another aspect of relational models: broad-based ownership. Farmer-owned cooperatives have a long history in the food industry, representing ways that small-holder famers can gain market power, both in the US and abroad. One example is Organic Valley in Wisconsin, a farmer-owned dairy cooperative with $1 billion in revenue, which systematically reaches out to bring new farmers into organic methods.

Its fundamental purpose is to pay its farmer-suppliers as much as possible—in contrast to Wall Street-owned agricultural companies, which aim to pay farmers as little as possible. Not all farmer-owned cooperatives exemplify best practices. But because farmers elect the board in these cooperatives, their voices have a greater chance of being heard.

The contrasts between industrial and ecological farming methods are important. But these physical technologies are only one-half of the paradigms in question. Social architectures are the other half.

About the Author

Marjorie Kelly is a Senior Fellow and Executive Vice President at the Democracy Collaborative and an Associate Fellow at the Tellus Institute. She oversees a variety of research and consulting projects in inclusive economic development, employee ownership, and place-based impact investing, working with groups that include city economic development, foundations, and anchor institutions. She was co-founder and for twenty years president of *Business Ethics* magazine. She is co-founder of Corporation 20/20, a multi-stakeholder initiative to envision and advocate enterprise and financial designs that integrate social, environmental, and financial aims. Her latest book is *Owning Our Future: The Emerging Ownership Revolution* (2012). She attended Earlham College and the University of Missouri and holds a BA in English, cum laude, and an MA in journalism.

Ashish Kothari

Lappé's essay is lucid, timely, and exciting for its attempt at connecting so many dots rather than being only a "technical" paper which proponents of "organic farming" can at times restrict themselves to. The stress on the social and political is especially welcome. The important question then becomes "how," and I would like to share what I think will be vital steps:

(a) Advocacy for women's rights to farming land and other resources. In many parts of the world, these are not well-established, and the male domination of agriculture (especially in its links to the state and the market) is part of the problem. More generally, recognizing the crucial role of women in agriculture is part of the struggle.

(b) Advocacy for community tenure, not only to agricultural lands, but also to other resources that agriculture is intimately connected to, including non-agricultural commons (grazing lands, forests, wetlands, etc). Sustainability of farming, as well as economic/social security for farmers, is crucially dependent on long-term tenure.

(c) Connected to the above, taking a more holistic view of agriculture by linking (or, where it existed in the past, relinking) with fisheries, animal husbandry, forestry, and crafts/agro-based manufacturing. This is crucial not only because of the ecological connections amongst ecosystems and nature, and the nutrients and other inputs that non-farming ecosystems provide to farming, but also because of the fact that agriculture alone will not be able to provide a full livelihood and employment security. An integrated approach with all these built in, however, could. Several villages in India, similar to the example that Lappé provides, have stopped or reversed outmigration using such an approach. Besides, capitalism and state-dominated systems have excelled at creating divisions between farmers, fishers, pastoralists, indigenous people, craftspersons, and other "ecosystem people," so a successful transition requires their reconnection and mutual strengthening, albeit in different circumstances than the past.

(d) Localization of agricultural cycles. This could also be successful if government or civil society programs linked to procurement and redistribution of food, such as India's Public Distribution System (PDS), are localized. An example from southern India (Deccan Development Society) has shown the potential for this by starting a parallel PDS using locally grown, organic millets. The same could be for public programs on food for work, free food for schools in poor communities, etc.

(e) Linking not only producers and consumers (which Lappé mentions) but also investors (as far as possible local), with the latter also receiving their "interest" back in the form of agricultural produce (thereby also building a bit more of a non-monetized exchange process). The initiative Just Change in southern India is attempting this; some CSA models in Europe or North America offer a similar approach.

The focus on self-governance (or what I could call "radical democracy") that Lappé points to towards the end of the essay is the crux of not only a sane agricultural future, but also of a sane future in general—linked, of course, to economic democracy, social justice, cultural diversity, and ecological wisdom and resilience. Applying these fundamental pillars or principles would also help us, I think, to sift the "green economy" kind of tinkering around within a capitalist or state-dominated system (in which "organic farming" is being pushed by big corporates) from a truly revolutionary transformation. Lappé's vision is certainly an important part of this.

About the Author

Ashish Kothari is on the core team of the Global Tapestry of Alternatives, and a coordinator of Vikalp Sangam in India. He has taught at the Indian Institute of Public Administration, coordinated India's National Biodiversity Strategy and Action Plan process, and served on the boards of Greenpeace International and Greenpeace India. He is co-author of *Churning the Earth: Making of Global India* and co-editor of *Alternative Futures: India Unshackled and Pluriverse: A Post-Development Dictionary*.

Fred Magdoff

Frances Moore Lappé's essay captures numerous facets necessary to understand the current state of farming as well as the possibilities for the future. Along the way, she dispels false notions about industrial agriculture and the potential for small farms and presents a compelling case for the importance of agroecological approaches to farming and living. And you can never explain too many times that the persistence of hunger and malnutrition amidst plenty is not an issue of production—there is sufficient food produced to feed everyone in the world—but of disparities of economic and political power.

Let me turn to a few of Lappé's central points, ones that I completely agree with. We know how to produce food in ecologically sound ways and that true empowerment of small farmers in the poor countries of the world, along with ecologically sound growing techniques, can have profound beneficial effects. In addition, small farm production using agroecological principles and practices can produce high yields per acre and encourage community members to work together. Assistance is needed to make rural areas more attractive, with the amenities required for a good life. This will help reduce the mass migration to slums of the South's cities that have few job opportunities, help the countryside to flourish, and assist in achieving food security for a region, and perhaps, a country.

That said, I wanted to offer several points of clarification:

(a) I would suggest that the heart of the matter is *not* "an economic model and thought system," but rather natural outcomes of the way the economic system of capitalism functions. The model and thought system are ways people try to describe this particular economic system; they are derived from living in its midst.

(b) Concentration of production in agriculture (input industries, processing industries, and farming itself) or manufacturing is a natural outcome of a competitive system in which production is for the purpose of making profits. Smaller firms and farms are not able to compete with the market power or economies of scale—which include both physical economies of scale and strictly financial ones—of larger units and thus go out of business. (In the wealthy countries, some small farms are able to survive by fitting into limited niche markets.)

(c) Decisions made by capitalist firms—be they in the service, manufacturing, or farming sector—are made for the purpose of producing profits (greatest income minus input costs).

(d) This means that ecological or social effects are at best secondary or tertiary concerns during the decision-making process, although in most cases they aren't considered at all. (Regulations, if they are enforced, may alter this, of course.)

(e) This is the origin of the social and ecological problems that arise from the way the capitalist economic system works. Economists call them "externalities," even though they are very much internal to how capitalism operates. They are best viewed as costs that businesses, instead of paying for, force onto people and the environment. Decisions that are completely rational within the logic of capital are at the same time ecologically and/or socially irrational. For example, Carrier recently announced that it is moving manufacturing of furnaces and heating equipment to Mexico, putting some 1,400 employees in Indiana out of work. A Carrier manager explained it clearly: "This is strictly a business decision." That is precisely the logic of capital. It is the same logic that makes sense of the factory system for raising animals. The whole purpose is to produce animals at marketable weights and have them processed as quickly and cheaply as possible so as to maximize profits. But there is nothing socially or ecologically rational about the inhumane raising of animals with routine use of antibiotics, the separation of the animals from the fields that produce their feed (necessitating large amounts of fertilizer application on the cropland while piles of manure accumulate on the factory animal farms), the poor treatment of farm labor and workers in the processing plants, etc.

(f) There are many examples of successful agroecological projects, and Lappé cites one in Ethiopia. But Ethiopia is also one of the prime targets for the twenty-first-century land grabs that are displacing inhabitants and providing few (if any) jobs. A successful agroecology project shows what is possible, but the existence of the self-interest of powerful economic and political forces indicates the enormity of what must be dealt with in order to create a better life for all inhabitants.

This brings me to the last paragraph of the essay. To me, the issue is to change the economic-political-social system to one that depends upon (modified, by deletion, from Lappé) "[d]emocratic governance—accountable to citizens, not to private wealth—[which] makes possible the necessary public debate and rule-making… within democratic values and sound science."

But the only way truly democratic governance and ecologically rational decision-making about what goods to produce and how to produce them can meaningfully occur is outside the logic of capital and the "logic" of the market. Markets might serve a minor purpose in a post-capitalist society, but only if there is true equity and social justice. However, extreme care is needed because as market mechanisms "naturally" function, they reproduce power (wealth) relations. They cannot do otherwise as long as significant differences in "private wealth" exist.

I would suggest that that food, clean water, sanitation, health care, education, and other basic human needs should not be commodities—produced in order to sell in the marketplace with the objective of making profits. Rather, such goods should be produced for the purpose of people using them. While distribution might entail the use of markets (though other mechanisms are possible), these goods should be considered among those that are the right of every human being. For this to happen, we need a profoundly democratic and equitable economic-political-social system that, by the very way it functions, supplies the basic needs of everyone using approaches and techniques that ensure the world ecosystem in which we are embedded—with all its complexities, essential cycles, and biological interrelationships—remains healthy over the long term.

About the Author

Fred Magdoff is Emeritus Professor of Plant and Soil Science at the University of Vermont. His areas of interest include agriculture and food, environment, and the US economy. His research at UVM was on ecologically sound ways to improve soil fertility, especially focusing on the critical role of soil organic matter. He is the co-author of the third edition of *Building Crops for Better Soil: Sustainable Soil Management* and *What Every Environmentalist Needs to Know About Capitalism*, and other books on agriculture and on the US economy. He has published numerous articles on environmental issues, including on ecological agriculture, production and use of biofuels, ecological civilization, population and global resource depletion, and the environmental and social problems of capitalist agriculture. He holds a PhD from Cornell University.

Antonio Roman-Alcalá

My contribution will try to address the important question of how a transition can most effectively be made towards agroecology. Any response to this question is by nature ambitious and should therefore be only provisional rather than certain. I offer these comments in that spirit.

Like others, I understand agroecology in the context of food sovereignty and the manifold politics it indicates which "remake our understanding and practice of democracy." I believe that the example of La Vía Campesina indicates—by example if not in rhetoric—that we not abandon any scale of organizing our political strategies of democratization, in a retreat to the "local" based on a rejection of the "global" nature of industrial capitalist agriculture.

While I don't doubt the advances from local and community-based efforts, I fear that the (obviously understandable) dismissal of national and international politics as untenable is only precluding the larger levers of change we need to more rapidly shift to agroecology in a transformative fashion. The localism implied in agroecology and food sovereignty needs to be placed into context: without state involvement (or, at least, the dismantling of its existing policies in favor of industrialism), without addressing international trade and placing effective governance controls over transnational companies and capital, without transnational norms of agroecological transition developed in, from, and for civil society (which provide discursive pressures on states), the local solutions on which so many of us are working will likely to continue to have only limited effects.

Thus, without action at all levels—international trade issues; national food policies like those found in food sovereignty activist-scholar Christina Schiavoni's 2015 analysis of Venezuela; the contributions of research, extension, and training initiatives; and localization principles grounded in practices of alternative food production and distribution—agroecology cannot spread.[1]

Clearly, national states are encouraged by capitalist state imperatives for growth to prefer an industrial model for agriculture. States often vote with their actions for export-focused, currency-generating (rather than locally-focused and food-security-enhancing) production. See the cases of Bolivia, Ecuador, and Brazil for examples where strong indigenous movements for agroecology and food sovereignty are having hard times effectively gaining policy implementation traction, though they find discursive support among policymakers.

Some take this to mean that "civil society" (i.e., social movements) should not even engage recalcitrant national states. This is a point of contention among academic observers and the movements alike, with the more autonomous-minded insisting that entry into the state coopts and takes the wind out of pro-agroecology/food sovereignty movements, and the more statist-minded arguing for progressive inclusion in state policymaking.

I hesitate to try to settle this debate here, but offer instead the idea that the strategic choice will vary contextually (states and movements are not all the same everywhere), and the choice is ultimately up to the movements themselves.

A more open attitude to states (and supranational modes of governance) entails accepting and committing to work through the inevitable contradictions that arise in making change through these spaces/modes. Some movements seem to accept this: even the supposedly "autonomous" social movements many radicals admire are wrapped up with states, leaning on them at times for valuable concessions, even with the all the contradictions that emerge in the process.[2]

With La Vía Campesina as one example among many, we can see that we cannot afford to abandon nation-states, even if they have indeed more often been barriers to than enablers of agroecology. A transitional strategy to food sovereignty requires a transitional approach to state sovereignty itself, wrapped up as it is in capitalist structures and imperatives, and laced through therefore with unavoidable contradictions. Schiavoni's work points to what this strategy might look like, in terms of the involvement of states: devolutions of sovereign control of resources and decision-making from state to local networks (in Venezuela's case, food producer and consumer collectives).

As scholars like David Goodman and E. Melanie DuPuis have pointed out, we need to avoid "normative" or "unreflective" localism, which assumes that proximity leads to better social and ecological outcomes.[3] Localization is key to a future sustainable and just food system, but it is only a necessary and not a sufficient component to it—and perhaps more importantly, it cannot be relied on for the transitional strategies for food systems governance that are—short of the agroecological, deep democratic, localized food sovereignty future we long for—compromised from pure ideologies, and full of contradictions.

Endnotes

1. Christina Schiavoni, "Competing Sovereignties, Contested Processes: Insights from the Venezuelan Food Sovereignty Experiment," *Globalizations* 12, no. 4 (2015): 466-480.

2. For the case of Brazil's Landless Rural Workers' Movement (MST), see Rebecca Tarlau, "Thirty Years of Landless Workers Demanding State Power," *Berkeley Journal of Sociology* 58 (October 2014), http://berkeleyjournal.org/2014/10/thirty-years-of-landless-workers-demanding-state-power. See also Vía Campesina's engagement of the UN's Committee on World Food Security.

3. E. Melanie DuPuis and David Goodman, "Should We Go 'Home' to Eat?: Toward a Reflexive Politics of Localism," *Journal of Rural Studies* 21, no. 3 (July 2005): 359-371.

About the Author

Antonio Roman-Alcalá is an educator, researcher, writer, and musician based in San Francisco. He helped found and manage San Francisco's Alemany Farm, the San Francisco Urban Agriculture Alliance, and the California Food Policy Council, and produced the documentary *In Search of Good Food*. His scholarly work stems largely from his experiences organizing agroecological urban farms and anti-gentrification struggles and focuses on making connections between land use, justice, environmental sustainability, and empowered inclusionary decision-making. Currently, he teaches permaculture with the Urban Permaculture Institute and organizes for changes in urban (social/physical) infrastructure at grassroots and municipal levels while working towards his PhD at International Institute of Social Studies at Erasmus University. He holds a BA from University of California at Berkeley and an MA from ISS.

Timothy Wise

Thanks to GTI for taking up this issue and doing so with Frances Moore Lappé's brilliant overview of the issue. She again shows her gift for marshaling a wide range of the most solid research in a way that is compelling and accessible. It is also wonderfully nuanced in highlighting that agroecology is primarily neither a state of mind nor a pure agricultural practice. Rather, it is a process, one in which agroecology itself should be seen more as a journey than a destination.

It is something I have been thinking about a lot since attending a conference in Mexico last year hosted by ANEC, a national association of small-to-medium-scale grain farmers. The convening organization cast the issue perfectly, I thought, referring to its own "Integrated Project on Scientific and Traditional Knowledge" and encouraging a "dialogue of knowledge systems," an inelegant translation of the Spanish "diálogo de saberes." The stated goal was to bring modern agroecological science into the fields to work with farmers to create more ecologically and—just as important—economically sustainable practices.

What was striking about the conference was the mix of people in attendance. On the one hand, we had established agroecology professionals and practitioners from all over the Americas, most notably from Cuba, where such practices are perhaps the most advanced. Many of these experienced agroecologists led discussions on diversified farming, integrated pest management, soil composition, the protection and use of native maize seeds, and the evils of corporate-led industrial agriculture.

On the other side of the room (literally)—in one breakout session—were about 100 ANEC members, farmers from different parts of the country, who were often silent in the larger discussion. Why? They were overwhelmingly commercial farmers, well integrated into national markets for maize, wheat, beans, and other staples. Many are now using hybrid seed varieties in monocultures fed by chemical inputs, which is practically the only way to sustain monocultures. These farmers were not returning to native maize seeds intercropped with beans and squash—the famous Mexican milpa—anytime soon.

ANEC's embrace of agroecology is, for them, a challenge, and it entails significant risks. Their farmers depend on farm sales for a living, and they can't afford the kind of initial yield decrease often associated with a shift to organic practices. They have loans to pay off, for one thing. But their lands are a long way from the agroecological ideal. Like many smaller-scale farmers in the developing world, they are no longer defending traditional agroecological practices. They are on the technology treadmill, and they know it is getting them nowhere fast, but that doesn't mean they can just get off.

In the conference room, we turned the discussion from agroecology as an ideal to agroecology as a transition, and they opened up. Their own experiences illustrated the genius of ANEC's approach to the issue, which focuses less on an ecological ideal than on the goal of reducing both production costs and dependence on multinational input suppliers. For these farmers, this is what "food sovereignty" means: increased control over their production and their livelihoods.

One farmer said that with the help of ANEC's scientifically trained extension agents, he had reduced input costs by two thirds and, despite a slight drop in productivity at first, had experienced a significant increase in profitability. Slightly lower yields but much lower costs. What practices was he introducing? Some that one associates with agroecology, such as compost instead of fertilizer, and microbial applications to release soil fertility. And some that one doesn't, such as self-produced hybrid maize seeds that his cooperative could produce for one-third the cost of the varieties sold by multinational firms. Fertilizer applications had been reduced from two to one per season, and pesticide use had declined as well. Soil quality was slowly improving, and he expected further reductions in chemical use. Did he expect he would reduce it to zero? No. Did he care? Not really.

This was what the transition toward agroecology looked like on a small commercial farm, and I was impressed at how different it was from the agroecological ideal. For millions of farmers around the world, including many of the farmers who grow most of the food for local markets, this is the kind of transition that needs to happen.

Lappé's characterization of the challenges facing us in agriculture left ample room for such practices, valuing them every bit as much as the crucial defense of native seeds and organic practices. I think many of us always knew there was a zen quality to her work: it's not the destination, it's the journey.

About the Author

Timothy Wise is Director of the Research and Policy Program at Tufts University's Global Development and Environment Institute and a Senior Research Fellow at the Political Economy Research Institute at the University of Massachusetts, Amherst. He was recently a fellow at the Open Society Foundation, where he carried out research on global agricultural and food policy in the wake of the food-price crisis of 2007-8. He is currently working on a book on small versus large-scale agriculture in the battle to feed the world, drawing on his research in Mexico, Malawi, Tanzania, Mozambique, Zambia, and India. Building on his experience as an economic journalist at *Dollars & Sense* magazine and as a development practitioner as Executive Director of Grassroots International, Wise has written extensively on the contradictions of US policy in international agricultural development. He holds a BA from the University of Massachusetts, Boston, and an MPP from Tufts University.

Author’s Response

Author's Response

I am deeply grateful to the many thoughtful respondents to my essay. You have helped me identify aspects of my articulation that are unclear and areas I want to explore more deeply, and I am honored by the thought you have given to my piece. I have included by thoughts below, organized loosely by theme.

The Spread of Agroecology, Its Capital Models, and Farmer Empowerment—Including Income Gains

Spreading agroecology requires capital. What capital models are congruent with agroecology? Certainly, public investment is one, as is often the case in Europe. In the United States, it takes three years for a farm to transition from chemical agriculture to be certified organic and able to benefit from its premium price, so public support during the process is critical. The 2014 US farm bill provides for public financial and/or technical assistance to help farmers with conservation practices and transition to organic agriculture: up to $20,000 per fiscal year, totaling no more than $80,000 over six years.[1] In India, I have also encountered small-scale revolving loan funds providing capital. I assume they exist in many parts of the world.

Cooperatives also offer a powerful capital model, and two weeks ago, I had the great pleasure of getting familiar with what a fast-expanding organic cooperative feels like. Speaking at the annual meeting of Organic Valley, the world's largest organic dairy cooperative, I learned that it assists aspiring organic farmers financially, as well as with advice from veterinarians and grazing experts, during their transition. Once they are certified, members get help in making energy improvements in solar and wind that can reduce costs and GHG emissions. I was told by an Organic Valley representative that its farmer members receive 51 cents of every consumer dollar, whereas a typical American dairy farmer receives only 10 cents.

Learning all this, I was not so surprised, though greatly encouraged, to learn that US farmers' desire to move to organic production is so strong that this cooperative expects to double its membership in the next decade. From a handful of dairy farms in 1988, Organic Valley has grown to a membership of 1,800 today—all encouraged to engage in guiding the cooperative they own. Clearly, the growth potential for agroecology and organic farming is vast. In the United States, less than one-half of one percent of farm acreage is organic, and it is highly concentrated, with just six states accounting for about half.[2]

Tim Wise's contribution helpfully reminds us that agroecological approaches "enhance control" for small and medium farmers "over their production and livelihoods." He quotes a farmer in Mexico explaining that extension agents with ANEC (an association of such farmers) helped him reduce input costs by two-thirds by relying on composting and other ecological methods, instead of purchased inputs. The result was a significant boost in net income, even accounting for an initial drop in his yields. And to defuse any mystification of what only agribusiness can accomplish, Wise also mentions a Mexican cooperative able to produce its own hybrid maize at a third of the cost paid to a multinational purveyor.

Within this theme, I also want to note Ashish Kothari's important comment that government and civil society procurement of sustainably grown food can greatly aid the success of "localization of agricultural cycles." I agree, and my favorite example is in southern India, where poor farmers using ecological practices have banded together to create the Millet Network of India. It has successfully lobbied state government to procure millet, which is much more nutritious than rice, for use in school meals and elsewhere as part of India's Public Distribution System.

Biodiversity, Women's Rights, and Community Tenure

Thank you, Ashish Kothari, for calling our attention to these three additional critical pieces of the map to fulfilling the right to healthy food via truly regenerative practices. In longer pieces, I have done a better job of giving at least the first two, biodiversity and women, their due place. On the role of women, I have used and highly recommend the work of Dr. Bina Agarwal, especially *Gender and Green Governance*. On community tenure, in *Food Crises and Gender Inequality*, Dr. Agarwal describes women engaged in "group farming" as a viable example of beneficial community tenure.[3]

Food as a Commons Rather Than a Commodity

This distinction—latent in my essay—between food as a commons and as a commodity—is a key one. The question I pose in, for example, *World Hunger: 10 Myths*, is how food can be both a human right—a responsibility we all hold in common and that is now spelled out in the constitutions of almost thirty nations—and at the same time a market commodity. Elimination of the market exchange of food seems unnecessary and unwieldy.

Attempts to fulfill this right now include a range of approaches: one is the direct distribution of a subsidized staple, with the world's largest such effort being India's rice distribution system. But only a fraction of the grain gets to its intended beneficiaries, and its nutrient value is very low. Other avenues to meet the right to food now being attempted in many nations include a floor under wages that is high enough to ensure income for purchasing adequate food. "Safety net" measures include "conditional cash transfers" now operating at some level in about two dozen countries.[4] Policies subsidizing small farmers to market healthy food in urban centers at prices accessible to low-income people have been proven effective in cities such as Belo Horizonte, Brazil. Of these approaches, conditional cash transfers are viewed by many as particularly effective because they have broad reach, are directed to women, and minimize transfer costs by being sent to electronically accessible accounts.

I thus appreciate Fred Magdoff's position that all basic human needs, from food and clean water to health care and education, should not be understood as mere market commodities. They are essential human rights. I agree and believe most Americans do as well, which might surprise a lot of people. For example, in 2007, 69 percent of us agreed that health care is a right, but the share has since fallen to 51 percent, indicating perhaps that such views are strongly shaped by public discourse and economic hardship. As to food, most Americans (68 percent in a 2007 poll) view it as a human right, yet we link its fulfillment to access to "fair pay" enabling one to buy food.[5] Given the partial successes of such approaches, to me it is clear that human rights will only be fulfilled as citizens challenge the now-dominant political systems I call "privately held governments" that make rules to favor the wealthiest.

Still Untouched, Farmers in Assam

I was delighted by the report from Sujata Dutta Hazarika about Assam in northeast India. There, while the tea industry moved to the chemical/corporate model, "food crops were fortunately not tampered with, and communities were allowed to carry on their traditional practices." My strong hope is that, as she writes, "haphazard adoption of organic agriculture" will not "jeopardize" the evolution of agroecology from the longstanding practices of the tribal peoples you applaud. Her contribution is a critical reminder that in most parts of the world there are traditional cultures that have not been destroyed and from which we have much to learn.

Rural Push or Urban Pull Undermining Life in the Countryside?

I also appreciate Dutta Hazarika's perception that rural life is increasingly "unattractive to the youth," noting the psychological dimension that my essay fails to mention: the challenge of ubiquitous media now presenting urban life as "the" exciting place to be at "great loss to the self-esteem of rural India." This is a very troubling dimension. However, as I do note, there is considerable evidence that where rural youth can see a pathway for a rewarding rural life they do want to stay in their communities. I note instances, for example, where many are risking greatly to defend their communities against "land grabs."

Permaculture

Yogi Hendlin rightly identifies a gap in my essay: that I did not highlight permaculture's particular contribution. Thank you. Permaculture's contribution is its focus on "nutrient systems" and "compositional science." I clearly have much to learn. Many understand permaculture as a philosophy of aligning with nature while viewing agroecology as the verifiable science with the same intention.

The Root of the Crisis: An Economic System or a Thought System? (And a Global Industrial Food System, to Boot)

Thank you, Fred Magdoff, for clarifying a key contrast in our perspectives. I have learned a great deal from you, so I find our differences especially interesting. You place our economic system—capitalism—at the root, with the dominant thought system arising from it, and I tend to see the thought system as itself a driver. The two certainly create a self-reinforcing pattern, thus I'm sure we could have fascinating (endless?) discussion about which is primary.

I understand capitalism as itself the product of an assumption of scarcity—with neoliberal economics defined as the science of allocating of scarce resources. Elsewhere, I argue that much of Western culture grows out of a presumption of lack of both "goods and goodness"—with the perception of scarcity the norm, from energy to food to human compassion—leading us to believe that we must seek an automatic, infallible force to sort out who gets what. From there, we grasp the mythical "free market" as that force and fall for the improbable notion that a market driven largely by one rule—that which brings highest return to existing wealth—will bring forth benign outcomes for all. Monopoly capitalism becomes inevitable, with all its antidemocratic and human-and-nature-destroying power.

Also relevant here is Vicki Assevero's comment that corporations really do "register their destructive impacts," and they try to hide them. She distinguishes this observation from my analysis. I agree completely with this important point. Going forward, I will strive to be clearer that I am saying only that the dominant economic model, and thus the rules following from it, does not incorporate this critical feedback (illness along with soil, biodiversity, and groundwater loss, for example) and therefore offers no inherent impetus to stem the losses.

The case of the failure of the Dhekiajuli Tea Estate, mentioned by Dutta Hazarika, is a powerful and sobering reminder that, as long as production operates within a market that does not account for its true costs to humans and to nature, companies attempting to "do right" will typically be unable to compete.

I also greatly appreciate Jennifer Clapp's clarification, which I fail to emphasize, that ours is a "global industrial food system" increasingly integrated via what I see as essentially stateless mega-corporations. She notes rightly, therefore, that solutions must involve fair trade and investment rules.

The Question of "How" We Bring to Life Solutions That Now Seem So Clear

Many respondents state or imply that the most critical question is "how": How can humanity make the shift that my essay advocates? I agree. In this vein, I especially appreciate the sentiment and insights of Jahi Chappell. He notes that, while capitalism as we know it can feel fixed, so in their day did previous world orders. But, given the unworkability of the current model and the "continuing experiments, examples, and imaginaries draw us ever nearer to what will later look like a sudden switch to a better way."

Democracy as More Than an Instrumental Value

In closing, please forgive me for diverting from direct responses to a more general reflection.

Many I know appear to view democracy as a means to an end, such as justice, environmental health, and other goods. I have, however, come to understand democracy as an absolute, or inherent, value for a number of reasons. I believe it is the only pathway enabling the meeting of human physical requirements but also the fulfillment of essential needs beyond the physical: our need for connection, meaning, and power (efficacy). If these needs are not met constructively, many humans do not merely wither or "make do." We seek to meet them in any way we can—including, today, through the rising tide of terrorism.

Evidence suggests that only democratic processes—characterized by the dispersion of power, transparency, and mutual accountability—create the context in which we humans can find *positive* fulfillment of these foundational needs. Though, of course, nothing is guaranteed.

Turning now to a more personal note, my life's work has kept me swimming in a stream with two currents—one food and hunger; the other, democracy itself. Beginning with *Rediscovering America's Values* in the 1980s, I have tried to understand and share a vision of democracy strong enough to address the roots of hunger. Ultimately, positive transformation of the misery and threats to life we are discussing here depend on democratic (i.e., inclusive, transparent, and accountable) governance at every level.

For this reason, I am now increasingly engaged in efforts to remove the barriers to "living democracy" and to define and pursue democratic pathways that make possible the alignment of farming with the earth and access to healthy food for all people, among other essential ends. In the last few weeks, for example, I have benefitted greatly from participating in the citizen movement Democracy Spring, via a march from Philadelphia to Washington, DC, and sit-ins at the Capitol involving 1,400 arrests. My handmade sign read "End Hunger, Fight for Democracy: Hunger is not caused by a scarcity of food but by scarcity of democracy." Democracy Spring calls for restoration of voting rights now being suppressed and for policy changes to remove the overwhelming power of private wealth within the US political system. In so doing, I felt I was not deviating from but continuing my half-century obsession with ending hunger.

Endnotes

1. Andrea Johnson, "Interested in Organic? Federal and State Programs Can Help with Transition," *Minnesota Farm Guide*, October 19, 2015.

2. US Department of Agriculture, "Organic Farming: Results from the 2014 Organic Survey," September 2015, https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Highlights/Organics/2014_Organic_Survey_Highlights.pdf.

3. Bina Agarwal, "Food Crises and Gender Inequality," DESA Working Paper No. 107 (working paper, UN Department of Economic and Social Affairs, New York, June 2011), http://www.un.org/esa/desa/papers/2011/wp107_2011.pdf.

4. "Conditional Transfers: Country Overviews and Project Information," World Bank, 2011, accessed April 20, 2016.

5. "Healthcare System," Gallup, accessed April 20, 2016, http://www.gallup.com/poll/4708/healthcare-system.aspx; Loren Siegel, Kate Stewart, and Nora Ferrell, *Human Rights in the U.S.: Opinion Research with Advocates, Journalists, and the General Public* (Washington, DC: The Opportunity Agenda, 2007), https://opportunityagenda.org/files/field_file/Human%20Rights%20Report%20-%202007%20public%20opinion.pdf.